RAILWAY ENGINEERING

AND MAINTENANCE OF WAY

Vol. V JANUARY, 1909 No. 1

1677-10-1

Railway Engineering

and Maintenance of Way

PUBLISHED BY

CRANDALL PUBLISHING COMPANY

RUCE V. CRANDALL, President WARREN EDWARDS, Vice-President C. C. ZIMMERMAN, Secretary
NORMAN F. REHM, Editor

FFICE OF PUBLICATION: Security Building, Cor. Madison St. and Fifth Ave., CHICAGO Telephone Main 3185

ntered as Second-Class Matter April 13. 1905, at the Post Office at Chicago, Illinois, Under Act of March 3, 1879.

TURNING THE CORNER.

We have turned the corner, another straight stretch of track marked by eleven posts lies dead ahead. The red line has been drawn, the balance struck and a new bunch of order books ready at hand for the long race. The sky is clear, the seats filled with an eager, expectant, enthusiastic audience. money to back every entry plentiful, in fact, conditions are favorable in every way for a record-breaking, wealth-making year.

Contrast conditions now with a year ago. Then we were in the midst of the storm, now it is all over. The clouds are gone, the wreckage has been cleared away, we have taken our bearings, settled down and are going ahead with greater hope, greater determination, a clearer head and more confidence than ever.

This is the time of the year to talk about getting more business—new business—new customers and more business from the old ones. A good resolution is to do more and do it better than you did last year. We want you to do more advertising than you did last year. It means more business for you because advertising is going to pull stronger this year than last. This is true of every industry. Last year even the mail order advertising of the magazines fell down. It wasn't the fault of the mediums but because everybody hung on to their money like the railroads.

This year it is going to be different. The people as well as the railroads are going to spend their money. You are sure to get your share if you go after it. The amount you get will be proportionate to the effort you make to get it. You need advertising to help you. If you are selling to railroads you need the RAILWAY MASTER MECHANIC, because it goes to the men who make up the requisitions.

Of course you can put this off but why do it any more than you put off calling on a man whom you know is a prospective customer. Do it today and be glad you have added one more salesman to your force.

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Railway Engineering

and Maintenance of Way

Mr. Lincoln Bush, chief engineer of the Delaware, Lackawanna & Western, has resigned.

Mr. G. J. Ray, division engineer of the Scranton division of the Delaware, Lackawanna & Western, has been appointed chief engineer, succeeding Mr. Lincoln Bush.

Mr. E. A. McFarland, chief field engineer for the Southern Pacific, has resigned and will devote himself hereafter to his private business interests.

Mr. W. S. Cotterman, superintendent of telegraph of the Detroit, Toledo & Ironton at Toledo, Ohio, has resigned, and his duties are assumed by the general superintendent.

Mr. Joseph Shea has been appointed superintendent of water service of the St. Louis & San Francisco, with office at St. Louis, Mo.

Mr. E. L. McDill has been appointed acting general foreman of bridges and buildings of the Middle division of the Missouri, Kansas & Texas, with office at Denison, Tex., succeeding Mr. J. G. Gossett, resigned.

The office of B. F. Rodgers, supervisor of road of the Baltimore & Ohio at Philadelphia, Pa. was moved to Darby, Pa.

Mr. H. K. Lowry, signal inspector of the Chicago, Milwaukee & St. Paul, has been appointed assistant signal engineer of that road, to succeed Mr. C. O. Harrington, resigned.

Mr. Thomas Sinnott, roadmaster of the Glenns Ferry district, Idaho division, of the Oregon Short Line, has been appointed roadmaster of the Kemmerer district, with headquarters at Montpelier, Idaho, succeeding Mr. P. A. Pheney, who has been transferred to the Glenns Ferry district, succeeding Mr. Sinnott.

Mr. Reuben G. Gray, roadmaster of the Toronto, Hamilton & Buffalo, died recently, supposedly from the effects of injuries received in an accident two years ago and from which he never fully recovered.

Mr. C. G. Delo has been appointed chief engineer of the Mexican Central system, succeeding Mr. L. Kingman, resigned. Mr. Delo was until Sept. 15, engineer of maintenance of way for the Chicago & Alton and then resigned to become chief engineer of maintenance of way for the Chicago Great Western with headquarters at Des Moines, Iowa.

Capt. Azel Ames Jr signal engineer of the electric zone of the New York Central & Hudson River, has resigned to accept a position with the Kerite Insulated Wire & Cable Co., New York.

Mr. J. H. Connelly has been appointed assistant roadmaster of the Inland Empire System, with office at Spokane, Wash.

Mr. C. R. McMillan, supervisor of the Pennsylvania at Tyrone, Pa., has been appointed supervisor in the office of the principal assistant engineer at Altoona, Pa.; Mr. H. L. Thomas, supervisor at Paoli, has been appointed supervisor of division No. 5 of the Philadelphia division; Mr. C. R. Sinnickson, supervisor of Haddonfield, N. J., has been appointed supervisor of division No. 2 of the Philadelphia division; Mr. Elmer Irving, supervisor at Osceola Mills, Pa., has been appointed supervisor of division No. 32 of the Philadelphia division; Mr. J. B. Hutchinson, Jr., supervisor at Newport, Pa., has been appointed supervisor of division No. 9 of the Middle division; Mr. D. T. Easby, supervisor at South Fork, Pa., has been appointed supervisor of division No. 5½ of the Middle division; Mr. M. I. Ward, supervisor at Harrisburg, Pa., has been appointed supervisor of division No. 7 of the Middle division; Mr. F. W. L. Schneider, supervisor at West Brownsville, Pa., has been appointed supervisor of division No. 8 of the Middle division; Mr. T. E. Lightfoot has been appointed supervisor of division No. 23 of the Tyrone division, and Mr. M. Lipman has been appointed supervisor of division No. 22 of the Tyrone division.

Mr. Edward C. Cole has been appointed traveling engineer of the Iowa Central, with offices at Des Moines, Iowa, succeeding Mr. W. B. Ferris.

Mr. J. B. Cozart, master mechanic of the Mexican Railway at Apizaco, Pueblo, Mex., has resigned to go to the Pan-American.

Mr. T. N. Ely, chief of motive power of the Pennsylvania, has been granted a protracted leave of absence to visit Italy, France and Egypt.

Mr. Harry J. Hair has been appointed foreman of the Baltimore & Ohio Southwestern at Seymour, Ind. He graduated in mechanical engineering from Purdue University with the class of 1906 and has been connected with this road since that time.

Mr. M. J. Powers has been appointed master mechanic of the Denver & Rio Grande, at Pueblo, Colo., succeeding Mr. W. A. Randow, transferred.

Mr. W. A. George has been appointed superintendent of shops of the Atchison, Topeka & Santa Fe, with offices at Albuquerque, N. Mex.

Mr. E. J. Shoffner, foreman of the Frog and Rail mill of the Norfolk & Western at the Roanoke shops, has been appointed general foreman at Cleveland, O., succeeding Mr. H. F. Staley, who was appointed master mechanic of the Carolina, Clinchfield & Ohio.

Mr. Frederick Regan, formerly with the Chicago & Alton in the motive power department, has been appointed master mechanic of the southern division of the Kansas City Southern, with headquarters at Shreveport, La.

Mr. A. W. Horsey has been appointed master mechanic of the Chalk River section of District 4 of the Canadian Pacific, with headquarters at Smith's Falls, Ont., succeeding Mr. G. T. Fulton.

Mr. A. West has been appointed master mechanic of

District 1 of the Canadian Pacific, with office at Kenora, Ont., succeeding Mr. A. H. Eager.

Mr. Calvin Schreck has been appointed head foreman of engines of the Cleveland, Cincinnati, Chicago & St. Louis at Bellefontaine, Ohio.

Mr. George K. Anderson has been appointed road foreman of engines of the Albuquerque division of the Atchison, Topeka & Santa Fe, with office at Winslow, N. Mex.

Mr. Manual Parra has been appointed master mechanic of the Mexican Railway at Apizaco, Tlax, Mex., to succeed Mr. J. B. Cozart.

Mr. Frank Hopper, road foreman of equipment of the Chicago, Rock Island & Pacific at Dalhart, Tex., has been appointed road foreman of equipment of the Dakota division and part of the Minnesota division, with office at Estherville, Iowa.

Concerning Some of Our Railway Supply Friends

IN nineteen hundred and one we first introduced the Protectus Company to our readers. A picture of Mr. W. C. De Armond and Mr. F. L. De Armond, with their exhibit at Saratoga, appeared among the "Snap Shot" photographs of that convention. They now need no introduction, but it is a pleasure to refer to the recent addition to the personnel of the company and publish in this connection the three pictures shown herewith.

Mr. Chas. H. Spotts appeared last June as president of the Spotts Formulae Paint Company, of New York City. Mr. Spotts is well and favorably known because of his connection for the past ten years as manager of the paint department of the Joseph Dixon Crucible Company, manufacturers of Dixon's silica graphite paint. He had severed his connection with that company with a view of establishing a paint company in the vicinity of New York that would make a specialty of paints for structural and ornamental work. Mr. Spotts has made a specialty for a number of years of architectural and engineering specifications, and has had charge of the painting of such structures as the hotels St. Regis, Astor, Knickerbocker and Belmont; Altman's new department store, the new McAdoo Terminal Buildings, the City Investment building, Broad Exchange building, as also a number of other important structures in New York and other cities. The recent legislative work done by Mr. Spotts, as chairman of the legislative committee of the Eastern Paint Manufacturers' Association, has attracted considerable attention. Associated with Mr. Spotts was Mr. Walter F. Swearer.

Mr. Spotts has recently associated himself with the Protectus company, Philadelphia, as its secretary, and Mr. Swearer becomes the New York manager, with headquarters at the Hudson Terminal.

MR. CHAS. H. SPOTTS.

MR. F. L. DE ARMOND.

MR. WALTER F. SWEARER.

Train Dispatching by Telephone

The telephone has recently been adopted on several divisions of the Great Northern Railway for train dispatching. On the Willmar division the line, 203 miles in length, has been completed and put into operation. Another line, between Devil's Lake and Williston, N. Dak., 238.8 miles in length, is under construction, and the extension of this system over 944.2 miles of additional road is under consideration. These future extensions cover the following districts: Williston to Cut Bank, Havre Butte, Great Falls to Virden, Great Fall to Great Northern Junction, Gerber to Sand Coulee and Stockett. The total mileage, therefore, including that in contemplation, is 1,386. The Union Pacific R. R. has been installing a telephone system between North Platte and Sidney, 193 miles, which is about to be put into operation.

A Paint Story Worth Telling

About ten years ago the Wadsworth-Howland Co. sold a certain large railway system running out of Chicago a quantity of station paint, which was used along its line. Sometime after this the official who had direct charge of this work left the road. Recently one of the principal officers of the road noticed these stations painted so many years ago and remarked about the excellent condition of the paint. He was unable to locate the manufacturer until he located the official who had supervised the work. He promptly wrote this man a letter, asking for information regarding the paint used on the stations, which information was supplied by the former official.

Much is said about "quality" and "reputation" in manufactured products, particularly of paints, because paint is a product, the value of which it is impossible to determine until it has been proved satisfactory by the service test—the only test worthy of serious consideration. In this case the manufacturer would seem to be entitled to the use of these much used and very much abused terms.

For this reason when a manufacturer has proof of the most uncontrovertible kind that his goods have both quality and reputation, all the value and advantages there are in these attributes should be accorded. Such proof is certainly not wanting in this case.

Promotion in the M. of W. Department

The Pennsylvania Railroad has broken a long-standing precedent in promoting John S. Considine of Columbia, Pa., to become assistant supervisor. Mr. Considine had previously been a track foreman, which may be considered the highest rank of non-commissioned officers on the road. An ordinary laborer could eventually become a track foreman, but it has not been the policy of the company to promote track foremen to a higher rank.

The Pennsylvania Railroad has employed graduates of technical institutions both in its maintenance of way and mechanical departments, to be trained for promotion to the important positions. A graduate civil engineer was employed as a rodman, and was considered in direct line for positions of assistant supervisor, supervisor, assistant engineer, superintendent, general superintendent, general manager or vice-president. In like manner mechanical engineers were given a special course of training for the motive power department. Outside of these two lines of promotion it had been impossible to rise beyond certain limits in the operating department.

Realizing that many employes who have not had the advantages of a college education, apply themselves so diligently to their work that they acquire a proficiency which should be recognized, the management has been carefully observing the work of all grades of men in the service with a view to promoting those who showed exceptional ability, no matter what their start with the company had been.

John S. Considine was the first to be promoted under the new rule. He had no college education. On the contrary, he entered the service of the company as a track laborer when but fifteen years of age. After five years at this arduous work, he was assigned to duty in a supervisor's office. There he acquired the rudiments of civil engineering. Later he was sent out on the road as track foreman, and his work in that capacity was of such a character that the title of general foreman of track laying was created for him. At this point Considine would have come to a sudden stop had it not been for the change in the policy of the company. He had reached his limit unless he could gain a "commission" as assistant supervisor, the place to which he has now been advanced.

There are some 1,500 track foremen on the Pennsylvania Railroad, and this removal of a long-standing barrier will make it possible for any one of them to be promoted to the company's higher ranks. The actual effect of the new policy is to open to every man in the service the privilege of promotion to any place for which he may be fitted.

The Santa Fe Directory

A book entitled "An Illustrated Biographical Directory of Officials of the Atchison, Topeka & Santa Fe Railway System," containing the photographs of 193 officials of the system, from President Ripley down, has just been issued. The book is the effort of Albert MacRae, managing editor of the Santa Fe Employes' Magazine, and is a very handsome example of the printer's art. The photographs are accompanied by a short biography of the officials, printed on the finest grade of paper of a light brown tint and bound in leather. While the author does not claim that the directory is complete as to photographs, owing to the impossibility to secure photographs of such a large number of officials, it is a very interesting book, both on account of the information contained in it and the excellent likenesses of the various officials of the Santa Fe system. The price of the book is $7.

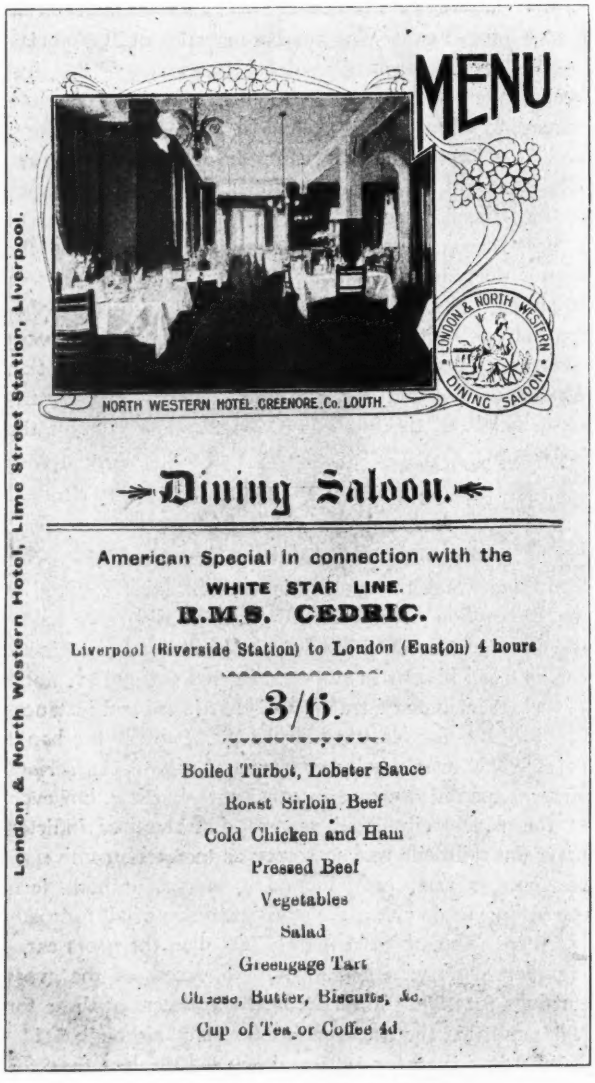
Railroad Earnings for 1908

The report states that the temporary financial depression from which the country is now emerging resulted in the diminution of railway revenues considerably below the high point reached in 1907, the banner year in American railroad history in respect of gross and net earnings, as well as volume of traffic, and that in several instances the necessity for placing railroad properties in the hands of receivers was wholly or partially due to the serious and unexpected decrease in earnings. In view, however, of the widely circulated reports that the loss inflicted upon the railroads was so severe as to warrant universal advances in rates or reduction in wages, or both, it is interesting to note that the gross earnings of all railroads for 1908, although $164,464,941 less than the gross earnings for 1907, were $98,875,470 in excess of the gross earnings for 1906 and $342,158,231 in excess of those for 1905, and that the net earnings for 1908, although $111,051,006 less than for 1907 and $59,349,138 less than for

1906, were $37,658,504 in excess of those for 1905. These figures indicate that whatever may have been the fact in individual cases, the railroads of the country, as a whole, did not suffer so severely in comparison with years of normal traffic and business conditions as may have generally been supposed. The recent change in accounting methods may affect to some extent the accuracy of these comparisons, but it is believed that the variations due to that cause did not materially alter the general result. It is pointed out that a continuing business depression could not be held to justify the maintenance of particular rates which are unreasonable in themselves or unduly discriminatory, since the right to equal treatment at reasonable rates does not depend upon the financial condition of the carrier.—From the Interstate Commerce Commission's report to Congress.

Block Signal and Train Control Board

The annual report of this board to the commission will appear as an appendix to the commission's report. The board has devoted its time mainly to the subject of automatic stops, because that is one on which knowledge is desired, whereas block signals are well known, and in dealing with automatic stops new and untried devices have afforded the most extensive field for the reason that those which are in use are either not adapted for use on roads carrying miscellaneous traffic or have not been offered to the board for consideration. The board has examined descriptions of 371 inventions and alleged inventions, and has completed its report on about half of these. Very few of these proposed devices have been actually constructed, and only 12 plans, devices, or processes have been found by the board to be of sufficient merit to warrant it in giving them any encouragement. Of these four have been installed, or soon will be installed, for tests. As the behavior of the apparatus under severe winter conditions is on of the main points on which information is desired, no satisfactory report on the apparatus actually installed can be made until next spring. This board has indorsed the commission's recommendation that legislation be enacted looking to the compulsory use of the block system.—From the Interstate Commerce Commission's report.



BY COURTESY OF MR. TOM WYLES.

An English Menu Card

AS Americans, when we think of a hotel or restaurant, in our hunger and excitement we ordinarily conjure up before our mind's eye a placard about as long, though not quite so wide, as this page, bearing the legend at the top "Table d' Hote," or, as the case may be, "A la Carte," and below this a list of the edibles, the real significance and composition of which we only wildly surmise and yearn to know, and never try to pronounce—this for the reason that it is fondly (or otherwise) believed that the Frenchman discovered cooking and has ever since maintained a complete and absolute monopoly of the art, despite what "mother used to make."

However, a lesson may be learned and a moral gleaned from the accompanying illustration of how they do it in Merry Old England. Here they spurn to honor the more frivolous French, plain old English being good enough for them ,and they write it just roast beef, without the "a la" frills, etc.

We may draw our own conclusions as to the generousness of the portions served and the quality of the food and whether we would relish the meal as well as one of the famously good dollar dinners served by any of the numerous railroads in America. This is English, you know, so must be par excellence, with the Englishman's pardon.

This picture is printed through the courtesy of Mr. Tom Wyles; if you don't know him, you ought to. He has not expressed himself as to the comparative value of the dining service of English and American railroads. In addition to the meal he ate at a cost of 3/6 he got this card, and he didn't say whether he took it as a souvenir or—but that may be another story. The editors vouch only for the illustration being a correct and truthful copy of the original, that's all.

Cast Steel Truck Frames

THE first step in the manufacture of cast steel truck frames is to obtain a metal of the required composition. Basic open hearth cast steel is used in the side frame, illustrated herewith, and is of a composition which affords a high elastic limit. In a derailment the frames may be bent out of shape, but they do not break, and in most cases they may be straightened and put back into service.

ONE-PIECE FRAME.

The Bettendorf truck frame, which is taken as an example, is a one-piece casting with arch bars, columns, spring seat and journal boxes cast integral with the frame. In the first place the construction gives a simple design which eliminates bolts and rivets. This latter feature will be recognized as a very important point in truck frame construction when the fact is called to mind

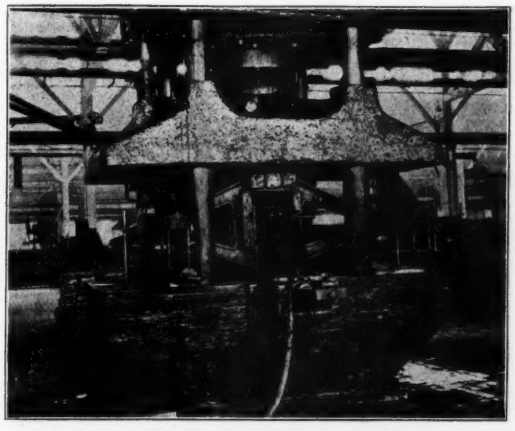


FIG. 1—PRESS IN OPERATION OF STRAIGHTENING THE SPRING SEAT.

that the force in the repair yard is constantly replacing column and oil box bolts and nuts. Still, large number of truck colts and nuts are missing in almost every line of cars, due to the fact that many cars seldom reach the yards where it is possible to handle these minor repairs. Nevertheless such minor defects may result in derailments as the truck frames are gradually weakened.

Besides, this simplicity in design means a reduced cost of maintenance. Where two or more men may devote all of their time to these minor truck repairs with the ordinary arch bar truck, none are required with the one-piece truck frame. When repairs are needed to a car they are of a more serious nature.

Another point which should not be overlooked is the reduction in weight which the one-piece frame affords. To illustrate approximately these frames gave a reduction in weight of about 1,000 lbs. per car.

DESIGN.

The distribution of metal is such as to effectually resist all stresses, allowing moreover a high factor of safety to which reference will be made under the description of tests. Metal is not wasted, however, in the frame so that the frame will still carry a greater number of load pounds per pound of truck frame, than the ordinary arch bar frame. This feature is not due entirely to careful designing but is made possible by the construction of frames.

The truck frame is built so as to be interchangeable with any standard truck frame. Any width of wheel base, design of journal box, height of bolster opening, etc., are possible without in any way interfering with the general features of the design.

With these frames a distance of at least 4 ins. is obtained between lower arch bar and the top of rail. In this connection it may be said that the frame will skid along the roadbed in case of derailment, and will not tear up the track which fact is due to the absence of loose bolts, nuts and parts of frame.

JOURNAL BOXES.

Regarding the journal boxes, which are cast integral with the frame, they are made of any standard design The strength of the connection between arch bars and journal boxes is ample, and in the test of the frame the connection receives a load equal to the weight of the car. There is a lug on the bottom journal box which may be used for jacking up when the truck is under a car.

In view of the fact that the journal boxes are cast integral with the frame, thus securing the advantages above mentioned, there is a guarantee to replace the entire frame if the journal boxes should fail in normal service or derailment. In most cases where journal boxes are damaged in wreck or derailment, they can be re-straightened in the railroad shops.

BOLSTER OPENINGS.

The bolster openings of the shape illustrated are for the rigid bolster. The designs for Barber roller construction and swing motion bolster provide straight column guides. There is a hole cast in the bottom arch bar, in which a projection on the spring plank is secured. In

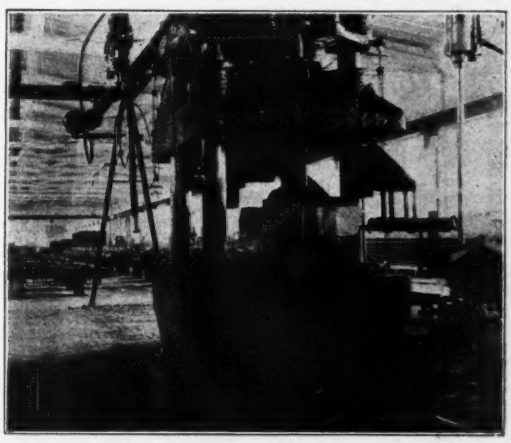


FIG. 2—TRUCK FRAME SUSPENDED ON SPRING SEAT.

this way rigidity is overcome to the extent that the truck is adjustable to track irregularities, and at the same time flange wear on wheels and end wear on brasses are reduced to a minimum.

TESTING AND SQUARING TRUCK FRAMES.

The machine for squaring and testing side frames,

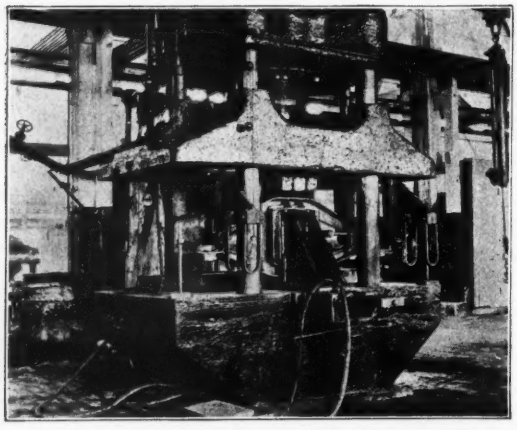


FIG. 3—SQUARING AND TESTING TRUCK FRAME TO CAPACITY OF CAR.

shown in the accompanying illustrations, is a press of 975-ton capacity. The first operation is straightening the spring seat and in Fig. 1 the press is shown with the dies on the platen pressing down upon the spring seat. After the spring seat is straightened the frame is suspended on the spring seat as in Fig. 2, ready to have the false journals slid in position in the journal boxes. Fig. 3 shows the press in the act of squaring and testing the truck frame. The upper portion of journal box where wedge bears against top wall of journal box, must be in line with the spring seat. Fig. 4 shows the top platen of press returned, the false journals slipped out of journal boxes and gauges in journal boxes to ascertain if the top walls of journal boxes are square with the spring seat.

The load, applied to the axles, as in Fig. 3, is equal to the capacity of car with which the frame is to be used and is, therefore, four times the load which the frame is to carry in service. As an example a 30-ton truck frame is tested with a load of 30 tons and a 40-ton frame with a load of 40 tons.

The truck frame is then turned upon its side, as shown in Fig. 5, and is straightened transversely so that the lugs for brasses on inside of journal box and the face of column guide are the proper distances from each other. The gauge is applied as in Fig. 6 to ascertain if the truck frame is straightened transversely.

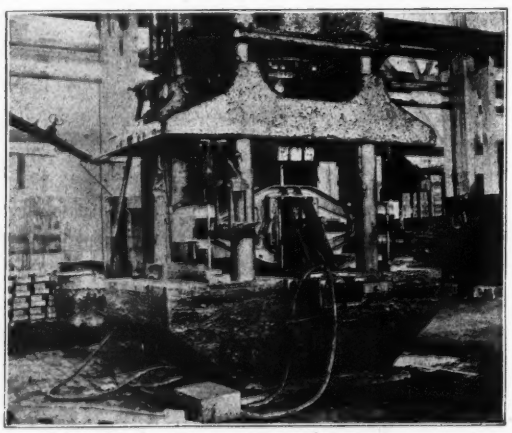


FIG. 4—GAUGES IN JOURNAL BOXES AFTER SQUARING.

INSPECTION AND FINISHING DEPARTMENT.

From the testing department the frames are removed by a 3-ton Pawling and Harnischfeger traveling crane to the finishing and inspecting department, shown in Fig. 7. The inspector gauges the wheel base and again tests the frames to see that they are square. In this department pneumatic tools are used to chip, to gauge the column guides and dust guard openings and to chip up the journal box openings so as to produce a good fit between box and cover. After the frames are finished they are painted and then taken to the assembling department by the traveling crane.

ASSEMBLING.

The number of operations required to assemble a Bettendorf truck is a minimum because of the small number of parts which are not riveted or bolted together. A view of the assembling department is shown in Fig. 8. All parts of the truck, including side frames, bolsters, brake beams, etc., are placed within access of the assemblers, so as to be handled by a 1,000-lb. traveling hoist. A pair of mounted wheels are run up on the elevated track and one side frame is placed in position. The wedges and brasses are then inserted in the journal boxes and the truck bolster set in position after which the second side frame, together with brasses and wedges, is added. Next, the bolster is raised up against the top arch bar and the spring plank and springs are slipped into position. Then after the brake beam is hung and brake rigging attached, the truck is completely assembled and ready to be placed under a car. It requires about 8 minutes to assemble this truck and about 9 minutes to dismantle it after the truck has been placed under a car.

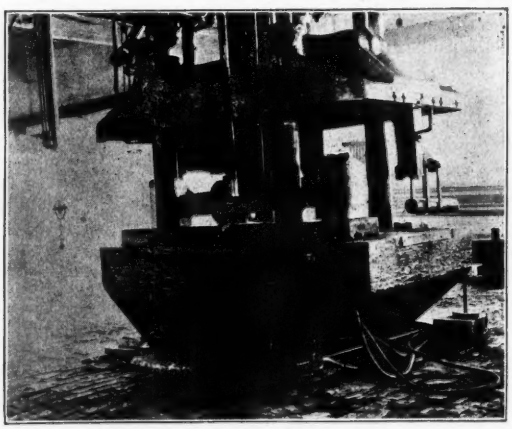


FIG. 5—STRAIGHTENING TRUCK FRAME TRANSVERSELY.

When it is necessary to replace a pair of wheels, there are no journal box bolts to be removed as in the common arch bar truck. It takes less time to dismantle the truck, illustrated herewith, for the purpose of changing wheels than it does to remove journal box bolts which are in many cases either rusted or bent.

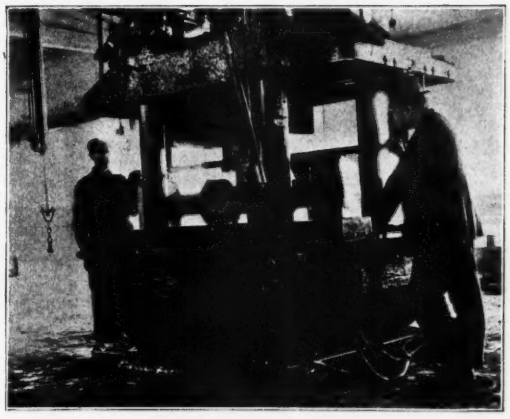


FIG. 6—GAUGING TO FIND IF TRUCK FRAME IS STRAIGHTENED TRANSVERSELY.

Signal Installation

Automatic block signaling and interlockings have been contracted for by the Hudson Companies for the protection of their Church street terminal in New York and the extensions of their tunnel system. The work includes four Union Switch & Signal Co. electro-pneumatic interlockings and also the intermediate block signals and train stops. The train stops will be actuated by compressed air instead of by electric motors, as the automatic stops now in that tunnel system are operated. The electro-pneumatic train stops will be practically identical with those which have been in successful operation in the subway of the Interborough Rapid Transit Co. The signals will be electrical, thus differing from the subway signals.

Panama Railroad Relocation Work

Preparations are being made to push the work on the relocation of the Panama railroad as soon as the dry season opens. This work may be divided into three parts, that from Gatun to Gamboa, from Gamboa to Pedro Miguel, and from Pedro Miguel to Panama. Between Gamboa and Pedro Miguel the line will run on the east berm of the canal at elevation 95, and the road can not be completed there until the construction work in the cut has been further developed. From Pedro Miguel to Panama the track is already laid to the end of Miraflores tunnel, leaving only a short stretch to be built. A force of 200 men will be at work during the dry season on the Miraflores end.

FIG. 7—VIEW OF INSPECTING AND FINISHING DEPARTMENT.

Most of the work of the coming season will be done on the stretch between Gatun and a point on the relocated line opposite San Pablo. From the point opposite San Pablo to Gamboa Bridge the track has already been laid over a series of high trestles which are being filled by spoil from Culebra Cut. No work has been done between San Pablo and Gatun. Early in January two steam shovels and a pile driver, and a force of 700 men will be set at work on the Gatun end and will work up the Gatuncillo Valley. In the Gatuncillo Valley the work is almost wholly along the side of the hills. A pioneer steam shovel will be sent through to excavate for a track, and will be followed by another which, in almost all cases, will complete the excavation back to the slope. The material to be handled is earth and rock. A few short trestles will be built across gullies. It is anticipated that the roadbed can be completed three miles up the valley by the beginning of the rainy season of 1909.

FIG. 8—VIEW IN TRUCK ASSEMBLING DEPARTMENT.

From San Pablo to the point where the line will turn west in the Gatuncillo Valley the construction is across the drainage system of the Chagres basin, and therefore consists of alternating cuts and fills. The larger part of the excavation will be rock and some of it will be heavy steam shovel work. It is thought that by the beginning of the next rainy season four miles of this part of the line will be finished. This will extend the track on the south end of the relocation as far north as Tabernilla. Two steam shovels and a pile driver will be used in this work and 500 laborers will be employed.—*The Canal Record.*

The second annual Cement show will be held in Chicago at the Coliseum from February 18 to 24, and from the number of exhibitors who have contracted for space it is surmised that the show will be highly satisfactory. The previous show contained many interesting exhibits of machinery, appliances and products and the coming show will without doubt excel in many respects.

Shop Buildings, C. R. I. & P. Ry.

THE Chicago, Rock Island & Pacific shop buildings and layout at El Dorado, Ark., are on a small scale, but contain some interesting details of construction. The section and plan of roundhouse, which is used in the extreme south, is shown in Fig. 1. This roundhouse has a depth of 90 ft. and is of frame construction on concrete foundation. The length of pit is 65 ft. and pit is 14 ft. 1 in. from the outer wall and 10 ft. 8-11/16 ins. from the inner wall. The walls of the pit are built of concrete and the floor of paving brick on edge grouted.

The walls and 10x10 in. posts have a concrete footing. The roof girders are 10x14 ins. and carry 4x14-in. joists on which are laid 2x8-in. matched and dressed roof boards covered by a composition roofing. The pitch of roof is 1 in 12 ins.

The design of smoke ventilator is shown in Fig. 2 and its location with respect to pit is shown in Fig. 1. The length of ventilator is 12 ft. and width 4 ft. The inside surfaces including both sides of lower slats are painted with two coats of oil paint and two coats of fire-proof paint.

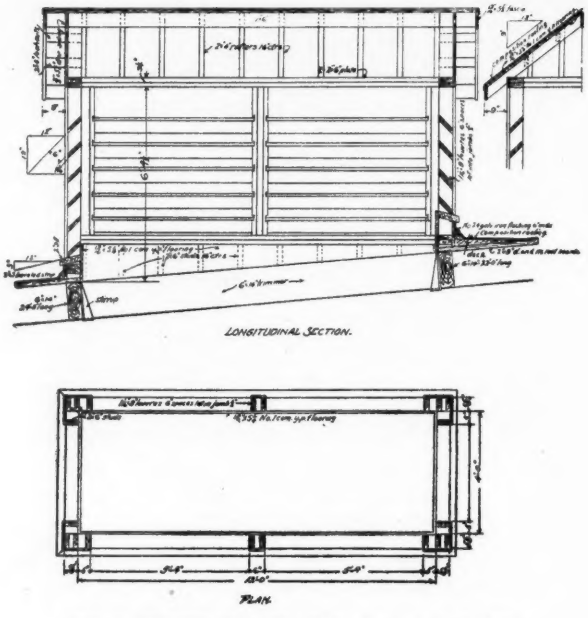


FIG. 2—SMOKE VENTILATOR, C. R. I. & P. RY.

In Fig. 3 is given a plan of the combination pit for drivers and trucks and in Fig. 4 is given a section through the pit. The walls of the pit are built of concrete. Allith track for No. 300 Reliable Merchandise carrier is to be bolted to bottom flange of I-beam. One Reliable Merchandise carrier is to be provided with a Yale and Towne 5-ton triplex block and the hand chain for operation of this block is to be 32 ft. long. The lift is to have a capacity of 5 tons.

A section through cinder pit is shown in Fig. 5. The

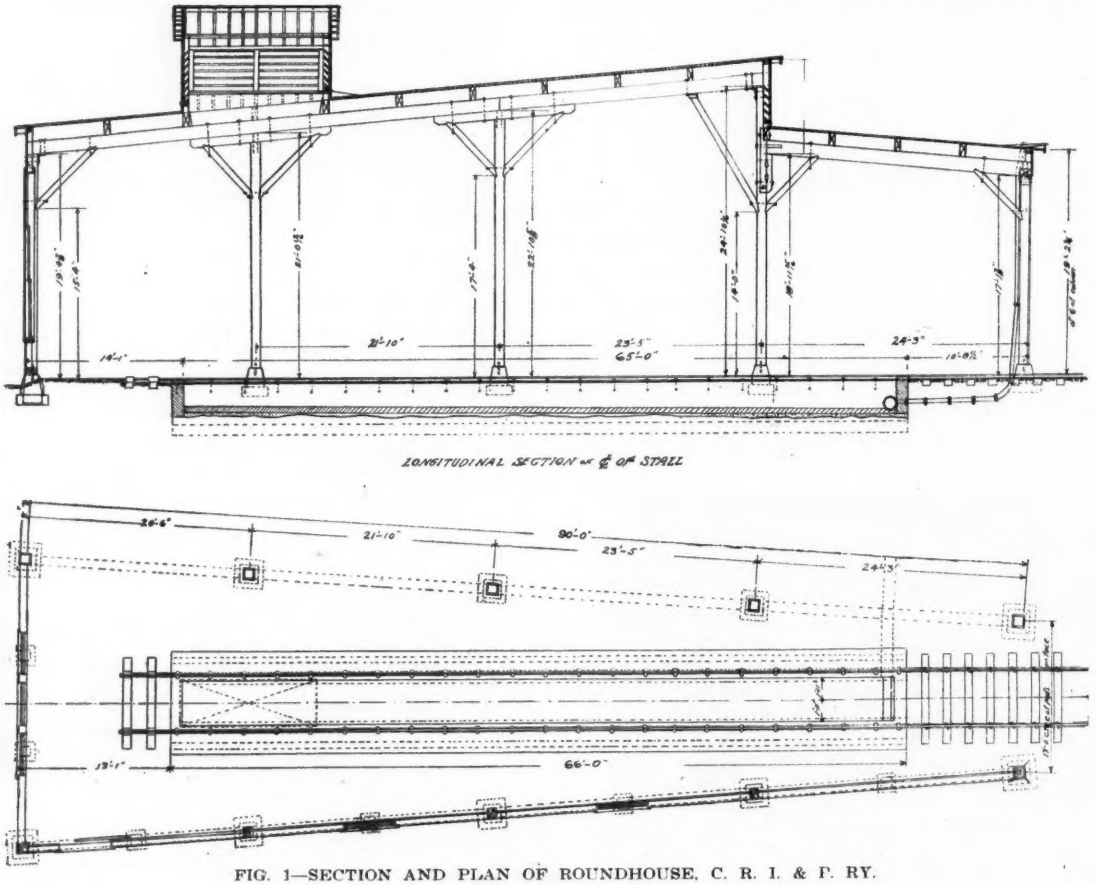


FIG. 1—SECTION AND PLAN OF ROUNDHOUSE, C. R. I. & P. RY.

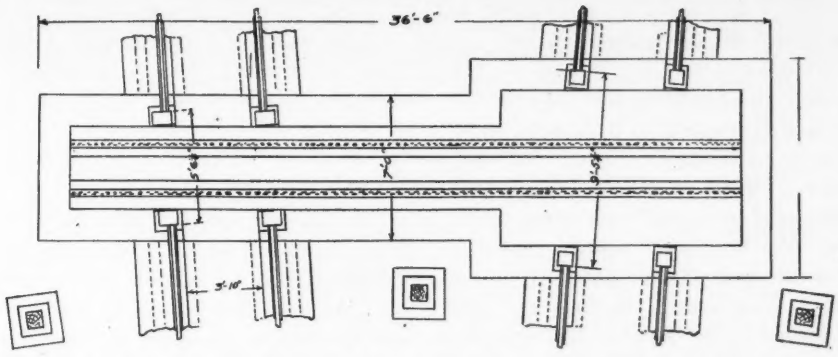


FIG. 3—PLAN AND COMBINATION PIT FOR DRIVERS AND TRUCKS, C. R. I. & P. RY.

floor of pit is of hard clinker-burned brick. There is a 5 per cent ascending grade to the cinder pit track and a 5 per cent descending grade to the depressed track.

Rail Specifications

The Pennsylvania Railroad Company's order for 135,500 tons steel rails for 1909 delivery has been placed, and the order has been accepted by the manufacturers, in accordance with the specifications, published in the May, 1908, issue with the exception of the following changes.

Paragraph No. 1 on chemical composition now includes two classifications for open hearth steel rails. Classification A is given in the May issue and classification B is as follows:

Open hearth steel rails:	CLASSIFICATION B.		
Carbon	0.62	0.70	0.75
Silicon	0.05	0.12	0.20
Manganese	....	....	0.80
Phosphorus	....	....	0.04

Under Tests and Inspection, paragraph No. 14 (*e*) with note is omitted, and paragraphs Nos. 16, 18 and 21 are changed to read as follows:

16.—Rails which, by reason of surface imperfections, are not classed as No. 1 rails, will be accepted as No. 2 rails; but No. 2 rails, which contain imperfections in such number or of such character as will, in the judgment of the inspector, render them unfit for recognized No. 2 uses, will not be accepted for shipment.

18.—No. 2 rails to the extent of 5 per cent of the whole order will be received. All rails accepted as No. 2 rails must have the ends painted white, and all top rails accepted as "Special" rails under Paragraph 14 (*d*) must have the ends painted blue. All classes of rails must be kept separate from each other, and be shipped in separate cars.

21.—For Bessemer steel, the makers shall furnish the inspectors with the carbon determination of each heat, and, also, two complete analyses which shall represent the average steel of each day's work, before the rails are shipped.

For Open Hearth steel, the makers shall furnish the inspectors with the complete chemical analyses for each melt.

These analyses shall be checked from time to time by the railroad company's chemist, and, on request of the inspector, the makers shall furnish a portion of the test ingot for check analyses.

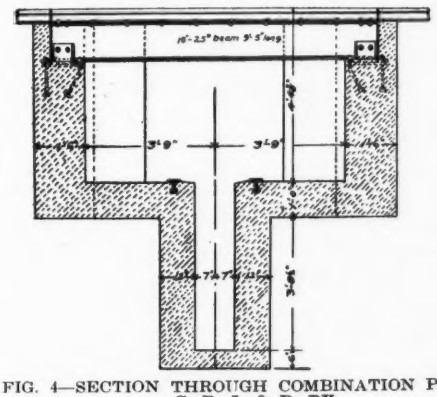


FIG. 4—SECTION THROUGH COMBINATION PIT, C. R. I. & P. RY.

The Railway Business Association has taken up the work of urging that everyone interested in speedy return to activity of transportation interests, and a resumption on the part of the railroads of purchases of material and equipment, will at once address demands upon their legislative representatives in state and national capitals for reasonable enactments and for a favorable attitude toward a fair adjustment of rates. That the campaign is to be an aggressive one is indicated by the selection of Mr. G. M. Basford, assistant to the president of the American Locomotive Company, as acting secretary. Mr. Basford will give undivided attention for several months to the effort which the association is making to show the public that anything hurting railroads also hurts whole communities of people directly and hosts of others indirectly, and that there is immediate necessity for a change toward moderation and calmness in railroad legislation.

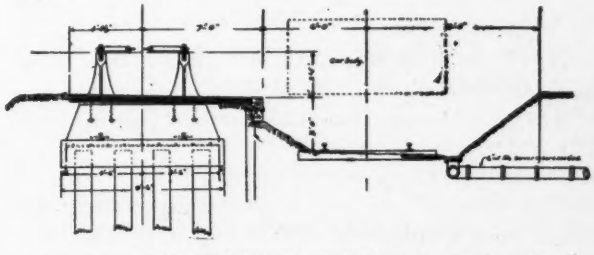


FIG. 5—SECTION THROUGH CINDER PIT, C. R. I. & P RY.

The M. of W. Department

Discussions of maintenance of way subjects by the men in charge of such work should prove of great value to all our readers and particularly to those who are directly associated with maintenance of way. We urge our readers, therefore, to take an active interest in these discussions, because such efforts will undoubtedly bring results. Our ideas regarding these articles meet with decided approval on the part of railroad men who understand the changing conditions. The following paragraphs are taken from a letter which we received last month:

"Information given in such articles should, I believe, be the result of practical experience as far as possible. Many writers are capable of theorizing very interestingly from a technical standpoint, which, of course, is very well under certain conditions, but those who have had large experience in M. of W. matters know that the care of the track consists in an endless amount of details, and it is the many details when properly attended to that produce an ideal track economically. I know of no railroad journal that gives the M. of W. matters the attention I think it deserves.

"It has been my privilege, or misfortune, to have been engaged in construction and M. of W. matters for the past thirty-eight years, largely M. of W., and it is interesting to review the past and note the development in all branches. Changes of conditions in other departments produce new conditions that are to be met by the road department, consequently books written on track matters a few years ago and which at that time were considered highly valuable, are, in some respects, at the present time, of little value to men who desire to keep abreast of the times. Therefore, if an up-to-date M. of W. department could be maintained in some railroad journal, I believe it would render a great service."

These statements indicate our reasons for establishing a M. of W. department. Very little time is required to write a few notes on any track subject in which you are interested and rough pencil sketches are satisfactory to illustrate the method.

Cutting and Destroying Weeds

Editor, Railway Engineering:

The question of cutting and destroying weeds is one which the maintenance of way departments of railroads have seemingly let take care of itself.

On practically all of the railroads in this section of the country weeds are cut with a shovel and thrown on the sides of the fills.

This is the method used on our line and is one that is very expensive, the cost of which from careful calculation, lasting over a number of years, is approximately $24.50 per mile per year.

The worst feature of this practice, on dirt track, is that in cutting the weeds you cut out the dirt from between the ties, also out from the heads of the ties, leaving a track lean and necessitating the section forces refilling the same.

I think that the proper method of getting rid of weeds is the one adopted by the Union Pacific, where they use a gasoline self-propelling weed burner.

Yours truly,

J. W. F., Roadmaster.

South Carolina.

[The chief difficulty which confronts the railroads of limited mileage is to obtain a weed burner at a cost sufficiently low to warrant the expenditure. We have been informed that efforts are now being made by certain manufacturers to build a machine to meet these conditions.—Editor.]

Prices on Track Materials, F. O. B. Chicago

Steel rail, 60 lbs. and over (Bessemer)	$28.00 per gross ton
Steel rail, 60 lbs. and over (open hearth)	30.00 per gross ton
Steel rail, 25 to 45 lbs.	26.00 per gross ton
Steel rail, 20 lbs.	27.00 per gross ton
Steel rail, 16 lbs.	28.00 per gross ton
Steel rail, 12 lbs.	29.00 per gross tan
Tie, 6x8x8 oak, 1st grade	74c each
Ties, 6x8x8 oak, 2d grade	67c each

Angle bars, accompanying rail orders, 1908 delivery, 1.50c; car lots, 1.60c; spikes, 1.80c to 1.90c, according to delivery; track bolts, 2.15c to 2.25c, base, square nuts, and 2.30c to 2.40c, base, hexagon nuts. The store prices on track supplies range from 0.15c to 0.20c above mill prices. Switch set per turn out, 60-lb. rail, $85 to $90.

OLD MATERIAL.

Old steel rails, rerolling	$16.00 to $16.50
Old setel rails, less than 3 ft.	14.50 to 15.00
Old iron rails	18.75 to 19.25

SHEET STEEL.

It is quoted for future delivery:

Tank plate, ¼-in. and heavier, wider than 6¼ and up to 100 ins. wide, inclusive, car lots, Chicago, 1.78c; 3/16 in., 1.88c; Nos. 7 and 8 gauge, 1.93c; No. 9, 2.03c. Flange quality, in widths up to 100 ins., 1.88c, base for ¼-in. and heavier, with the same advance for lighter weights; sketch-plates, tank quality, 1.88c, flange quality, 1.98c. Store prices on plates are as follows: Tank plate, ¼-in. and heavier, up to 72 in. wide, 2.00c to 2.10c; from 72 to 96 ins. wide, 2.10c to 2.20c; 3/16 in. up to 60 ins. wide, 2.10c to 2.25c; 72 ins wide, 2.30c to 2.40c; No. 8 up to 60ins. wide, 2.10c to 2.15c; flange and head quality, 0.25c extra.

STRUCTURAL STEEL SHAPES.

Store quotations are at 1.95c to 2.00c, and mill prices are as follows: Beams and channels, 3 to 15 ins., inclusive, 1.78c; angles, 3 to 6 ins., ¼ in. and heavier, 1.78c; larger than 6 ins. on one or both legs, 1.88c; beams, larger than 15 ins., 1.88c; zees, 3 ins. and over, 1.78c; tees, 3 ins. and over, 1.83c, in addition to the usual extras for cutting to extra lengths, punching, coping, bending and other shop work.

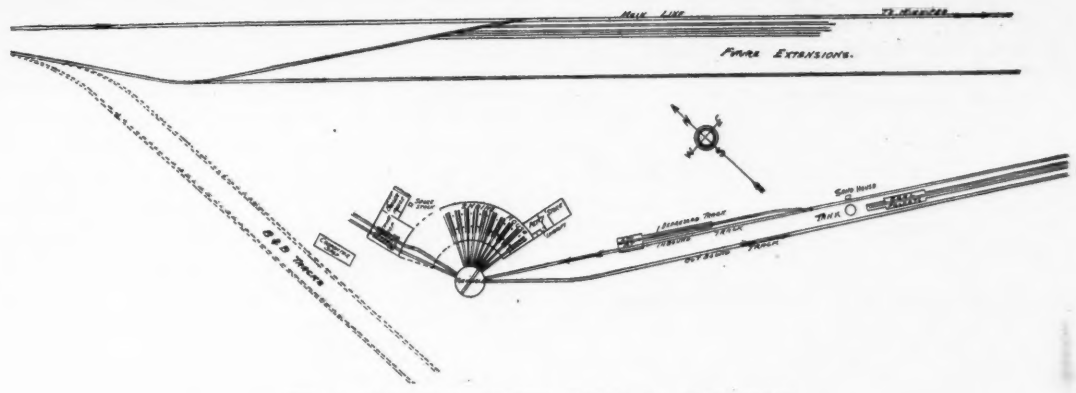


FIG. 1—CANADIAN PACIFIC SHOPS AT SASKATOON.

CAST IRON PIPE.

Quotations per net ton on water pipe, 4 ins., $28; 6 to 12 ins., $27; over 16 ins., $25; with $1 per ton extra for gas pipe.

CEMENT.

Good grade Portland cement, car lots....$1.65 per bbl.*

*(Four sacks per bbl. credited 10c each when returned in good condition.)

SAND.

Band sand, car lot .....$0.75 per yd.
Torpedo sand, car lot ..... 1.15 per yd.

CRUSHED STONE GRAVEL.

Crushed limestone, car lot .....$1.05 per yd.
Crushed gravel, car lot ..... 1.10 per yd.

Saskatoon Shops, Canadian Pacific Ry.

THE arrangement of the Canadian Pacific shops at Saskatoon is shown in Fig. 1. The coal pockets are located between the in-bound and out-bound tracks, which lead directly to the turntable. The sand and water supply is near the coal chute, while the depressed cinder pit is along the in-bound track midway between coal chute and roundhouse.

In this layout it will be noted that the turntable supplies both the roundhouse and machine shop directly. The tracks lead from the turntable to the two erecting pits, as shown in the accompanying plans.

The boiler house and engine room are connected to the machine shop as in Fig. 2. The machine tools are

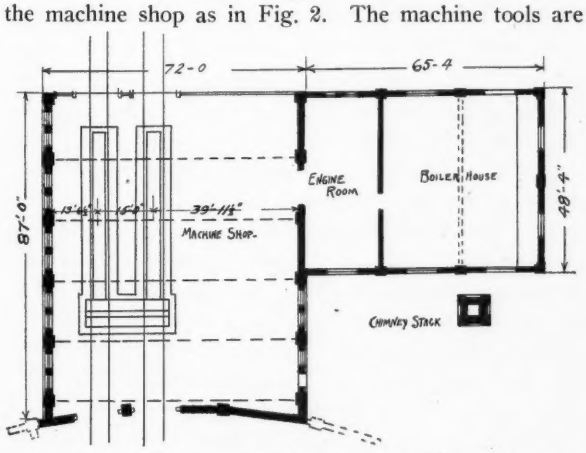


FIG. 2—MACHINE SHOP AND POWER HOUSE.

located between the erecting pits and the engine room. The inner wall of machine shop is about 185 ft. from the center of turntable pit.

The arrangement of machine tools is shown in Fig. 3. The main shaft for driving these tools extends the length of the shop and is run at a speed of 130 r. p. m. The speed of countershaft for the driving wheel lathe at the left is 133 r. p. m.; the speed of countershaft of the McCabe lathe is 130 r. p. m.; the speed of countershaft of the McGregor Gourlay lathe is 280 r. p. m.; the speed of countershaft of the McGregor Gourlay shaper is 200 r. p. m.; and the speed of countershaft for the Bertram drill is 365 r. p. m.

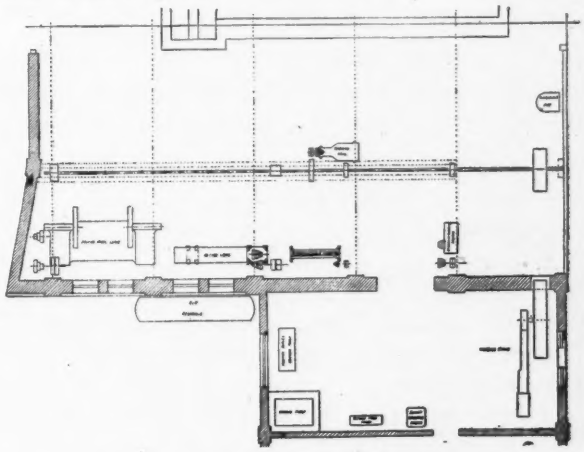


FIG. 3—ARRANGEMENTS OF MACHINES.

The main shaft is driven from the Wheelock engine in the engine room, which also contains a 300 h. p. Webster heater, a Northern duplex washout pump, a vacuum pump and a boiler feed pump.

Concrete Station Building

In renewing station buildings the Wabash Railroad is adopting a style somewhat similar to the mission type. Some of these buildings have steel frames, and some have wooden frames, covered with expanded metal, but the entire building, including the roof, walls, floor and platform, is of unfinished concrete, which makes a substantial, sanitary and fireproof building, taking the place of the old frame building so long used generally for railroad depots.

RAILWAY ENGINEERING
and Maintenance of Way

Published by the
CRANDALL PUBLISHING COMPANY

BRUCE V. CRANDALL, President
C. C. ZIMMERMAN, Secretary
WARREN EDWARDS, Vice-President
NORMAN F. REHM, Editor

Office of Publication: Security Building
Corner Madison St. and Fifth Ave.
CHICAGO
Telephone, Main 3185.

A Monthly Railway Journal

Devoted to the interests of railway engineering, maintenance of way, bridges and buildings.

Communications on any topic suitable to our columns are solicited.

Subscription price, $1.00 a year; to foreign countries, $1.50, free of postage. Single copies, 10 cents. Advertising rates given on application to the office, by mail or in person.

In remitting, make all checks payable to the Crandall Publishing Company.

Papers should reach subscribers by the tenth of the month at the latest. Kindly notify us at once of any delay or failure to receive any issue and another copy will be very gladly sent.

Entered as Second-Class Matter April 13, 1905, at the Post Office at Chicago, Illinois, Under the Act of Congress of March 3, 1879.

Vol. V. Chicago, January, 1909 No. 1

The Past Year

THE records of the year, 1908, indicate that betterment work was reduced to a small amount in all departments. By this statement it should not be inferred that any of the railroads have allowed their equipment to depreciate in a way to hamper the transportation facilities, but that new shops and their equipment, cars, locomotives, etc., have not been built except in cases of need.

The number of cars built in 1908 was 78,000, while in 1907 there were about 290,000. This shows a reduction of almost 75 per cent. In consideration of the number of surplus cars, which varied approximately between 450,000 and 110,000 for the year, there was not a pressing need for many new cars.

During the past year the steel box car question was discussed in several organizations, many mechanical officials being in favor of steel for the superstructure as well as for the underframing. Mr. W. R. McKeen, Jr., stated that the Union Pacific all-steel box cars developed no defects. At the Master Mechanics' and Master Car Builders' conventions last June the Bettendorf all-steel box car, built by the Bettendorf Axle Co., Davenport, Ia., was exhibited.

In 1908 there was also a reduction in the number of locomotives built. There were approximately 7,300 built in 1907 and 2,300 in 1908, which means almost a 70 per cent reduction. Among the more important questions concerning locomotives that were considered last year are the mechanical stoker and the superheater. The committee report of the Master Mechanics' Association on mechanical stokers was to the effect that mechanical stoking is successful and it included descriptions of the more important mechanical stokers, but in the case of superheaters no definite recommendations were made in the report which covered the present data on the subject. The development of the Mallet compound continued as an important question in locomotive design.

Railroad extension in 1908 was chiefly in the west among the roads that were building Pacific coast connections. There was a decrease in new mileage from 5,200 to 3,200, about 40 per cent.

In reviewing the work of the past year it is not surprising to find that betterment work was materially curtailed. It was a natural consequence of the market conditions because traffic was radically reduced, the railroad companies being affected to a greater degree than other industrial concerns. The gradual resumption in all lines is being felt, however, and this early revival is due to the resources of the country, which in agriculture could hardly have been more gratifying.

It is not logical to have an immediate return of normal conditions, so we must look forward to a steady renewal of activity. This means that the betterment work in all departments will be systematically taken up, which in the past year offered the best means of reducing expenses in view of the smaller gross earnings.

Mallet Articulated Compound Locomotives

THE advantages of the Mallet articulated compound locomotive in meeting the demand for greater power were brought out in a paper by Mr. C. J. Mellin at a recent meeting of the American Society of Mechanical Engineers. The use of this type of locomotive in freight service has already demonstrated its good points, which also favor its application to passenger service, especially in districts where there are heavy grades and sharp curves. The chief advantages are given briefly, as follows:

"The Mallet articulated arrangement presents the advantages of enormous tractive power concentrated in the combination of the two sets of engines with practically no increase in the individual weights of the moving and wearing parts over those of engines of the ordinary types; double expansion of the steam; simplicity and ease in operation; and a short rigid wheel base, with the weight distributed over a long total wheel base, resulting in the greatest flexibility and ease on track and bridges. It was also found possible at the very first to provide an engine under the control and operation of a single crew, having double the power of the largest engines of the ordinary type."

It is noted that over a hundred locomotives of this type have been built and that these range in weight on drivers from 106,000 lbs. to 410,000 lbs. and from 20,000 lbs. to 125,000 lbs. in tractive power. Tabulated data are given on the heaviest designs of different types, which show that the tractive power of the Mallet engine is double that of the other types. With engines of the same tractive power the weights of moving and wearing parts are much less for the Mallet type. This type of locomotive entails a logical development and with varied details of design the same principle may be used in meeting the future demands in passenger service. Relative to slipping the following comparison is given:

"With the ordinary engine, slipping at such times is a serious matter, as the train is losing speed and may stall on that account after a few repetitions. In the case of the articulated engines, the loss in power by the slipping of one engine is practically gained by the other, in the increase of unbalanced pressure that thereby results. This difference in the unbalanced pressure has the opposite effect on the slipping engine, usually causing it to stop slipping after a few revolutions, without the necessity of closing the throttle. This is explained by the fact that, when the low pressure engine slips, the receiver pressure naturally falls and reduces the back pressure on the high pressure piston, as well as the forward pressure on the low pressure piston; causing the latter engine to stop slipping on account of the friction against the rail under the reduced receiver pressure, which reduction also increases the average unbalanced pressure on the high pressure piston a corresponding amount."

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*The Education and Organization of Railway Engineering Labor**

By J. E. MUHLFELD

For two reasons I am gratified for the privilege of accepting the Secretary's invitation to take part in this meeting. The honor of being called upon to present to this Club a paper on such an important topic is in itself worthy of appreciation, while the usual attendance and interest taken by the members in the discussion of a technical question more than repays me for the time and work involved in its preparation.

Referring to the subject, "The Education and Organization of Railway Engineering Labor," we are all aware that American citizenship engenders in railway employes the essential characteristics of duty, aspiration, education, employment, discipline, organization and co-operation, each of which are factors in the following conclusions:

First. That it is the duty of all young men to exercise their mental and physical powers for the purpose of improving their minds and bodies to equip them for the greatest usefulness in vocations which will produce manly men and provide the greatest recompense.

Second. That every young American should aspire to be an octogenarian and divide his life into decades, the prevailing time of the first being naturally devoted to play and of each consecutive decennium to work and reading combined with education, paternity, experience, competence, travel, nature and religion, respectively. This will enable the applictaion of the period of greatest mental and physical activity, namely, from twenty to fifty years of age, to the best use, as well as the devotion of forty years to each, chiefly labor and recreation.

Third. That the education of labor, which term applies to mental as well as to manual work, should be conducted along liberal lines by systematic instruction and discipline, combining the intellectual with the physical and the technical with the practical; each young man being trained for his peculiar and special class of capability.

Fourth. That in the employment of labor, the essential characteristics of practical ethics, health, temperance, integrity, personality, energy and endurance should be considered, in connection with industrial education, as the determining qualifications.

Fifth. That the discipline of labor should be governed by an accumulative efficiency and deficiency system, whereby such a feeling of confidence and security will be manifested between the employer and the employe as will augment individual effort, moral obligation and assumption of responsibility.

Sixth. That the organization of labor should be limited and confined to those Employers and Employes Mutual Benefit Associations wherein individuality and freedom of conscience will be maintained, and any correlative action will result in reciprocal benefits to the owners and operators of the property.

Seventh. That a co-operation between capital and labor through the inauguration of profit-sharing plans, whereby a limited percentage of the preferred securities will be directly available for periodical distribution on an installment payment basis among employes desiring remunerative benefit through enhanced investment values, dividends and bonuses, will secure beneficient and constructive co-partnerships and the establishment of relief, savings and pension features and of educational and recreational facilities will instill conciliation and promote individual and collective co-efficiency.

In this age of civilization and specialization that man is in demand who, unique in financial and administrative genius, can expand his powers through executive ability to organize and direct large bodies of men and to evolve and consummate great undertakings or concentrate all of his energies upon and excel in one profession or trade-learning. Prestige and honestly accumulated wealth are not to be discouraged, as men of fortunes are generally constructionists, who make use of time, labor and material-saving methods and inventions to facilitate the activity in every line of human endeavor for the development and less prodigal use of the natural forces and resources, and insist upon that respect for the law which

*Presented at the January meeting of the New York Railroad Club.

makes for sober, patient enterprise, achievement of success, and the advancement of civilization.

The problem of today is not only to develop the inanimate mechanical forces, methods and materials, many of which have been, and all of which may be, standardized, but to study, select, train and manage the animate human element, which cannot be standardized, and is the potent and controlling factor in the man-machine unit. The supervision of this unit must be such as will inspire a personal interest and enthusiasm of the animate in the inanimate and stimulate individuality, without which superior intelligence and skill in the subordination and utilization of means would not result.

Except in case of unusual burden, every young American holds the key to success in his hands and should learn to appreciate the immense power of his personal equipment, such as instinct, perception, ingenuity, initiative, determination, self-reliance, prudence, courage, knowledge and experience, and of some particular ability which enables him to accomplish with ease that which it is difficult or impossible for others to do.

To expand these faculties, the first requisite is moral strength, which naturally applies that mental and physical vigor, which is the measure for the cultivation of knowledge, capacity and resolution, as only the healthy intellect is capable of receiving and retaining impressions necessary for the execution of ideas and to evolve concentration of thought, freedom of action and personal power.

To develop the mind, body and morals of young men during the scholastic period, plenty of open air, pure water and nourising food in combination with systematic gymnastic, athletic and military recreation are factors which should be correlative with the elementary, technical and engineering teaching.

The usual highly specialized physical training should be replaced by all-round physical culture, and in addition to compulsory education in hygienics, gymnastics and athletics, the young man should be imbued with the fact that sound constitutions must be supported by good rules in morality and decency of living to maintain health and strength. Certain physical as well as mental standards should be established and mental proficiency combined with inferior physique, or mental deficiency combined with superior physique, should not obtain when by proper training intellectual and physical acquirements may be more evenly balanced.

Identical requirements should be exacted of those of limited, moderate or unlimited means and exclusive characteristics should be removed from both the common and collegiate courses, as social distinctions are bound to detract from the educational obligations. Such general environments and routine common to all will make for physical perfection; cleanliness and neatness in personal appearance; high ethical standards; respect for discipline, law and order; self-restraint, patriotism and good citizenship.

The curriculum of the elementary schooling should be confined to the comprehension of the pupils, and the general rather than the classical branches of learning should be taught to promote perfection in grammar and composition, while oral demonstration and inductive reasoning should prevail rather than the memorizing, text book and dogmatic methods of teaching. Instructions to develop manual skill and business efficiency should be combined with this tuition, and where secondary or collegiate education is not obtainable, the mathematical, scientific, technical and cultural schooling should be broadened by taking advantage of the many opportunities now offered by railroad and manufacturing shop classes, evening and correspondence schools, clubs, societies, lectures, libraries, trade papers, periodicals and books, pending the establishment of adequate municipal and state free institutions, in the vicinity of the engineering and industrial centers to meet the growing necessity for the advancement of common sense trade instruction in combination with the cultural high school teaching.

The collegiate education should be comprehensive as well as intensive so as to develop the mind on broad liberal lines and instill a feeling of responsibility, sense and of character and self-control. The engineering and industrial training should be combined with the technical instruction and knowledge in scientific methods of working and the fundamental principles of engineering should be inculcated through specialized handicraft by means of actual shop, drawing room and laboratory practice in a manner that the student will be thoroughly infused with the necessity for acquiring technical and practical knowledge in the selection and management of men and machines by means of personal contact, observation, investigation, interrogation, perspicacity and the benefits derived from travel. The necessity for exhaustive study of the various branches of learning should be modified and generously combined with animated instruction and demonstration by professional specialists of broad practical knowledge and experience, so that the student's general health will not be impaired nor valuable time lost by tedious tasks.

Political economy in its wide sense as relating to the social, industrial and national questions of the day, should receive careful study and discussion at gatherings, meetings or entertainments where frank, unaffected and energetic examples of American fellowship and manhood should expound the principles of true patriotism, industrial freedom and equality, equitable competition, sound methods of business administration and financial integrity to the end that correct public opinion may be founded on the benefits of educational progress.

During the advanced educational term it is of particular importance that the student should employ the majority of his vacation time in an unlimited apprenticeship with some industry where he will come in direct contact with the actual working and supervising forces so as to learn the trade and physical requirements of his vocation. Such a combination of schooling and working will not only advance the final term of apprenticeship, but will

be of retroactive and sequential benefit in early establishing essential capabilities and acquaintanceships.

For all practical purposes, the elementary, technical and engineering education need not exceed a term of twelve years, during which period a certain proportion of the industrial shop apprenticeship time should also have been served and the more advanced schooling proportioned twenty-five per cent each, technical study and instruction and fifty per cent engineering practice.

With engineering work a clear and concise character of language is of particular importance in the preparation of technical correspondence, reports, specifications, and contracts, as well as in the promulgation of rules, regulations and instructions for the guidance of others, and a command of good speech not only exhibits breeding and social accomplishment but will facilitate administration, avoid unnecessary discussion, reduce the liability for error and lessen the need of lawyers and the courts. Frequent attendance at good lectures and the reading of standard books will result in a greater knowledge of pronunciation and of the distinction in the meaning and use of words as well as to increase the vocabulary.

Clubs and associations organized for the promoting of knowledge and mental culture through the reading, discussion and circulation of appropriate papers at meetings and conventions are also invaluable in securing an interchange of engineering ideas from men whose professional and practical research and experience may establish a basis for the determination of disputed questions.

By means of the liberal and demonstrative training as set forth, the mental and physical powers of ambitious and aspiring young men will be developed and disciplined to effective action; they will realize the importance of loyalty, subordination, punctuality, regularity and promptness; the value of tact and diplomacy; the necessity for honesty, perseverance, self-reliance and resourcefulness; the need of readiness, good sense, and natural ability in knowing what to do and how to do it in case of reversal rather than success; the power of established principles, fixed opinions and ability to grasp ideas; the prestige through ability to command respect of associates and even adversaries by politeness, courtesy, kindness, enterprise and courage; the advantage of being able to reason and analyze administrative, financial and commercial questions and withal, the infinite worth of broad knowledge, friendly companionship, moral character, good address and culture.

Young men instructed along such lines, while appreciating the value of schooling, will more particularly esteem that knowledge which enables them to find and make use of the information contained in books rather than to actually absorb their contents. Their minds will be receptive and have the faculties of insight, calculation, arrangement and generalization. They will have the ability to concentrate their force and effort on the task at hand. They will have the courage to maintain their own convictions and to acknowledge when they are wrong. They will acquire the qualities of common men, inspire confidence and make use of their attainments for continuous and rapid progress. They will cultivate the reading of good literature and thereby broaden their intellect. They will practice systematic saving and achieve financial independence. They will cultivate cheerfulness, wholesome and comfortable living, good society and refined enjoyments and will advocate upright citizenship, patriotism, liberty, progress and expansion.

The primary reason for engineering research is to establish facts so as to direct and control the forces of nature for the use and convenience of mankind and the training necessary to master this great branch of science, combined with commercial ability, should develop qualifications for honest and constructive administration. Uneducated, untrained and casual labor has low ideas in life, no sense of responsibility for the public welfare and is retrogressive inasmuch as it is unable to improve great opportunities or measure up to large responsibilities; whereas intelligence and integrity not only inspire confidence, but as a matter of self-preservation enhance competition and compel progress by encouraging rivalry in multiplying and improving methods, processes and mechanisms.

The contention of the present day is that too much specialization exists in American education, but the broadening of the different engineering arts necessitates particularization as a means of promoting qualification and mechanical skill in trade learning. A specialized engineer will perform work much easier and with greater dispatch than an untrained general service mechanic, as intellectual equipment for executive work and the knowledge of correct methods for using tools is of more value than the individual excellence in hand skill. In the same way will engineers having the advantage of the broadest education in head and hand training, in combination with energy, ambition, and culture, be the most successful. The advantage of being able to make a presentable appearance in evening dress as well as a consistent one in overalls is of the utmost importance in making for sound opinion.

True friendship in business association is unquestionably one of a young man's valuable resources, as promotions of great importance, when decided in equity are frequently influenced by favor born of a friendship following proved knowledge, integrity and social attainments.

Commercialism is the ruling factor in American progress and evokes the necessity for competent and lucrative employment. Therefore, the successful workman and supervisor of the future must be better qualified in personal equipment, training and reliability for the assumption of increased responsibility.

The personel and morale of a working and supervising force is the product of natural selection and elimination and depends largely on the employment rules in vogue. When expansion is not too rapid and the controlling conditions will permit, the ideal method for filling vacant or new positions is through a well established apprenticeship and merit system founded upon a selective principle of requiring the applicants to meet certain moral, physi-

cal and educational characteristics to qualify them for the service to be performed, as well as for continued advancement.

With such systems the initial moral investigation should determine as to the previous service record, serious vices and affiliation with demoralizing associates and require such integrity and liberal habits as are within the bounds of manly moderation and temperance. More particularly does this apply to use of intoxicants, as alcohol destroys initiative and self-reliance and threatens morality, reliability, physique, sanity, health and life.

The physical examination should cover the age, height and weight limits, vision, color sense, hearing, heart action, cleanliness and deformity and the educational inquiry should ascertain as to the general intelligence and competency for the vocation to be followed.

A fulfillment of the entrance requirements should not suffice for the applicant's entire term of service, but periodical moral and physical investigations and progressive mental and intellectual examinations should be conducted for the purpose of determining upon the employes who are competent for continued service and advancement, making proper disposition of those who are incompetent, sick, disabled or aged, and eliminating those who are delinquent, lacking in ambition and thrift, or are otherwise undesirable. By such a process of examination and elimination, a competitive system is inaugurated, which will be productive of individual enterprise and industry and of collective efficiency and success.

The primary reason for discipline is to effect improvement in personal conduct and in the service and not as a matter of punishment. The cumulative efficiency and deficiency methods of discipline now in vogue should promote a feeling of greater security and confidence between American labor and capital inasmuch as good service rendered is recognized and rewarded by continued employment and promotion. Therefore, with just methods of administration and negotiation; high average wages; loan, savings, medical, sick, injury pension and death benefits; rest lunch, toilet, recreation, athletic, education and entertainment facilities; free transportation and other benefits now generally enjoyed by railroad employes, whereby they can spend their time off duty comfortably, pleasurably and profitably at a minimum cost, there is no good reason why the improved moral tone, personal cleanliness, honesty and courtesy, should not promote the lasting friendly, charitable, benevolent and protective relations between the employer and employes so necessary to bring about industrial peace, higher standards and a proper degree of safety, efficiency and economy.

A substantial business is founded on the basis of economic law which provides for mental and material activity and expansion, comes within the bounds of natural limitations, and avoids extremes in risks that might impair the credit of the financial and commercial world. Such a concern is the product of intelligence justly, vigorously and persistently applied to details by means of organized thought and management, which must necessarily obtain through a freedom, companionship and co-operation between the supervising and working forces.

The value of an hour's wage to the employer, employe and commonwealth is largely dependent upon the amount of effective brain combined with useful brawn. Clear heads must combine with skilled hands and active minds with trained muscles to promote high individual and collective efficiency. Those employes who complain of legitimate work which they may be called upon to perform under reasonable conditions are not overburdened, as a desire to excel does not result in protest.

Labor should provide a reasonable return for its compensation, as when inflated by incompetency, limited quantity or indifferent quality, it makes for and is a greater evil than inflated capital. Such labor, being paid for service it does not render, consequently consumes more than it produces and this loss of active capital must be figured in an inverse ratio to its reserve or earning capacity. While capitalization can be explained and accounted for, losses due to inflated labor cannot be fathomed or regained, and must forever remain a debit to the fixed wealth of the nation.

While labor should be protected from unjust monopolistic aggression and corporation abuses and be sustained in its full and legitimate rights by equality of justice through the power of the law, it should not be unjust, oppressive or immoral in contending the right of owners or employers to carry on and manage a legitimate business as they may deem proper. Employes who are unmindful of results and render the least service for the wages paid should be replaced by workmen who realize that they should individually justify and be held strictly accountable for their expenditures of time and material.

Each aggressive action on the part of labor which causes unnecessary discord and obtains against the peace of the community or the rights of fellow citizens and every effort of organization influence to inaugurate optional rather than the absolute regulation, exercise individual judgment regardless as to whether it will promote extravagance or economy, disregard obedience or cancel discipline and thereby destroy supervising direction and authority and jeopardize the best interests of the traveling and shipping public, can only result in lowering the moral and social standing of its members, in the demoralization of industry, in the destruction of life and property and in the suffering of employes and their families.

In this country there are certain individual rights of life, liberty and happiness which do not justify wrongdoing and the responsibility for permitting known dangerous policies and methods to continue should be clearly established. Personal liberty exists in proportion to wholesome and ethical restraint and that schooling of the masses which will inspire them to firmly exert their influence to condemn reckless agitation or rude demands for the permissive relation of labor and commend moderate tone and scope of social reform and greater mutuality of action, moral obligation and assumption of responsi-

bility, regardless of class, fraternal, political, sectarian and organization differences, will make for cordial and continued co-operation between the employer and the employes, equal and impartial protection in all its rights and general stability, progress and welfare of the nation.

The franchise reserved to the citizenship of railway employes should cultivate natural sodality and equality, individual constitutional liberty, social betterment, comfort, happiness and contentment; the conservation of railroad interests and the proper development, protection and utilization of the natural forces and resources of the country. Therefore, the conservative classes who have made their fortunes and the liberal masses who may have a competence to accumulate, should set aside their provincial, racial, administrative and legal differences, and unite in partisanship to principle rather than to party. That principle should demand a separation of the professional and volatile political from the progressive and substantial financial and commercial interests and the inauguration of sound executive, legislative and judicial government administered for, by and of the people. Political apathy, professional noise, fanatical agitation, illegitimate speculative influences, frenzied words and convulsive changes do not inculcate a spirit of unity and good will or strengthen the relations between capital and labor, but cause consternation, and therefore jeopardize the financial and commercial interests at large, the well being of the population and the national greatness. Corporations have their obligations to the public service as well as to their employes, but professional politicians who dispense rather than enforce the law, and unprincipled speculators, have none and therefore produce a relativly small proportion of the country's industry.

Where substantial progress is in evidence, it cannot be expected that mistakes will not occur, as progress is against reversion and is the outcome of experience which may be the result of error brought about by inexperience, over-zealousness, neglect or incompetency and teaches many things that cannot be acquired in other ways, such as definite opinions with respect to administrative policies and conduct, the value of sober second thought, meditation and arbitration; the benefit of sane reform by orderly methods; the sound reason in tact, diplomacy and conservatism; the discrimination between luxuries and necessities; the inadvisability of lavishness, reckless extravagance, inflation and over-extension, and that all things governmental, industrial and social should be presented on their merit rather than on their popular qualities.

That the people do not know and understand each other is a fundamental cause for lack of collective harmony, and to this end a process of education and a campaign of publicity through the press is essential for the purpose of bringing about a political readjustment to meet the new conditions and the more progressive and constructive policies. The mass as well as the classes are indirectly and directly the owners of the railroads which unite the people and the country through their investments and savings in banks and trust companies. This ownership should be increased among the railroad rank and file in order to broaden their lives beyond the mere day's work, and secure greater business assets in the way of education, trade, bank account, home and particularly through copartnership in substantial corporations by acquisition of sound investment securities.

The commodities of capital and labor must both flow to the centers of commerce and industry, and their combinations and consolidations are essential to progress and will continue to grow rapidly if for no other reason than that they result in convenient and co-operative groupings of the wealth and people of the country, for the purpose of economically increasing production and to promote human welfare.

Finance and commerce are the strongest weapons through which to gain supremacy in the mercantile, industrial and agricultural pursuits and the combined intellectual and physical man-power vested in the owners, builders and employes of transportation companies and of those allied industries that serve and are largely dependent upon them for their livelihood can and should unite for mutual protection and to command the administrative, financial and commercial interests of the nation.

Railway and industrial properties are mutually dependent and when, for any cause, the wheels of transportation stop, the commerce of land and water and consequently labor, must suffer and the stability, expansion, progress and promotion of the country's interests are immediately and seriously affected.

The transportation facilities of a country are the true test and index of its financial and commercial development, as without them the interior regions would be waste land. As carriers and storers they form the connecting link between the producers or shippers and the consumers or receivers.

The railoads lead the world in the application of new ideas and in this country their unprecedented conveniences for personal travel and active competition, resulting in condensation in bulk, increase in commodity value and safe, rapid and cheap transportation evoke the wealth of agriculture, animals, mines, forests, wells, quarries, mills and factories and the energy of many millions of people, from all of which the nation derives inestimable progress and prestige through the market that is made for the powers of its population and the products of its natural resources.

The continued enormous increase in the production of grains, live stock, poultry, fish, produce, fruit, vegetables and plants required for the world's sustenance, necessitates a corresponding increase in the output of manufactured products, all of which means extended, increased and improved transportation facilities, or business stagnation and retrogression in commercial supremacy.

As a means of transportation, of the natural and artificial highways, the latter are essential to the former in order to unite the population with the resources of the country and in times of prosperity their labor and equip-

ment keep the streams of capital and commodity in motion to and from the great centers of supply and demand. However, in this country, the railways, unlike the waterways, receive no support or protection from the people, and must force their way to the front by sheer ability of management. They rank as the largest consumers and pay the highest average price for labor and material, but receive the lowest average rates for service performed of any in the world. Through legislation, they are regulated as to rates and revenue of taxation; methods for financing, oerating and maintaining; distribution of expenses and in the inauguration of costly betterments and appliances, with the result that their return on the capital invested averages less than for any other industry and their credit does not attract the funds for necessary improvements and extensions.

The railways are operated by capable and honest employes whose brains and energies are engaged in the difficult problem of rendering the distinct srvices of conducting transportation in compliance with the statutes, satisfactory to the patrons, and profitable to the owners of the property, but the general staff has suffered during recent years through the loss of efficient men who have taken up less irksome and more lucrative industrial and commercial work.

The present and coming generations in this country, who can change the course of procedure, have food for reflection in the example of governmental policy and assistance which has enabled the vigorous prosecution during the past year of the work on trans-continental and interior railway extensions and improvements for the purpose of developing Canada's agricultural and industrial pursuits. More particularly does this apply for the reason of the rapid development now possible in that country through means of readily available subsidies and aid from the Dominion and Provincial Governments, capital at low interest rates, quick means of communication and scientific methods of facilitating, increasing and economizing the output per unit of productive area in new developments, all of which results in marketing at a relatively higher profit.

The exigency of the railroads and the industries which serve them necessitates that they have an understanding with their patrons and the people at large such as can and will bring about hearty co-operation and eliminate unjust laws and harmful regulations to transportation and corporate administration. Constructive statesmanship discourages indiscriminate agitation and restrictive legislation which deprives a country of its power of initiative or retards progress and typifies laws that are stimulative and protective to honest methods. Honorable speculation is constructive and a form of science requiring study, foresight and shrewdness as well as capital for the purpose of assuming the risk incident to the conducting of business between the producer and the consumer and the benefit of exchanges in enhancing the values of commodities for the former and in the maintenance of stability in prices for the latter, as well as in the diffusion of the ownership of large corporations through the absorption of their securities by small investors, is invaluable.

Advancement and progressive reforms in the great financial and commercial problems of the future must result from the social and civil association of men of scientific and practical learning, who will render strong personality and collective effort in dislodging long established customs and abuses and appeal to the intelligence and fairness of the people for the inauguration of a new intellectual vision and political work. Such changes necessarily involve a measure of peril and this lot should naturally fall upon the railway and industrial owners, operators and employes, who speed commerce and civilization on its way and are in a position to unite the efforts of statesmen, capitalists and business workers to a common interest in the restoration of confidence in the business future through adherence to the fundamental principles of the law and constitution.

Concerning Catalogs

THE catalog is the most important form of advertising that any manufacturing concern can put out. Next to showing the prospective customer the machine itself, the goods on the shelf or whatever article is to be sold, excepting of course that personal work of the salesman, the catalog together with other advertising is by far the most important element in the sale of goods.

This being true, it is a fact that will not be questioned, that the catalog which will be treated by itself in this discussion, should contain in every respect not only the best that can be obtained in the art of composition, so that every statement is made in the clearest manner possible, but this idea should be carried out in every detail. The utmost care should be taken in selecting the best type, the best quality of paper and the highest grade of work in the engravings.

The only exception to this rule is where the desire is not to produce the impression on the customer of the highest character and best quality of the product to be sold. In such cases it will usually be found that the firm producing the cheap catalog is a large mail order house or a manufacturer of a large number of specialties of a cheaper grade and where price is the only consideration in securing orders.

First impressions are usually lasting ones and a catalog is most often a "first impression." Consider then how important it is that a customer should be properly impressed by the character of the firm and the class and quality of the product through the catalog which is given to him. While cost is a factor in printing a catalog, taken on the whole, it should be considered that the catalog will reach hundreds of customers, actual and prospective, and thus this cost is apportioned among the individuals, it will readily be seen that the cost per individual or rather the increased cost per individual, of a good catalog over a poor one, or in

getting out a book worthy of the firm, will be very small and will pay handsomely on the investment in the long run.

The word, catalog, means a list or record. In selling goods or products in this day, it means more—it means not only a list of the goods manufactured or sold, but a complete description of such products together with photographs and drawings fully and completely illustrating the superiority claimed for such products, so that the customer may see and understand with the least possible mental effort, just what is being offered to him, without actually seeing and touching the thing itself.

It would then follow as logically as one step does another, that in getting out the catalog every means that will aid the customer in bringing to his mind a picture of the product or machine of the manufacturer, should be taken advantage of.

To begin at the beginning, the first thought probably of any manufacturer, after he has produced something he desires to sell, is a catalog in one form or another. If he has just started and has but one specialty, possibly his catalog will be nothing more than a circular describing his product—a catalog in embryo—but it is a catalog nevertheless. As his business grows, his catalog grows.

In the art of selling goods there is nothing, of course, that compares with the personality of the salesman. Next to the salesman is the catalog. It might be said that the catalog is an absolute necessity in the work of the salesman, for what salesman, no matter how clever, how persuasive, how eloquent he may be, can paint with words, a picture of the machine or device he is selling one half so effective as an engraving from a photograph, of the machine itself. True he may carry around a sample of the thing itself, but this does not apply to most products, particularly the lines of heavy machines and products. It is the photograph that tells the strongest story and gives the customer something besides mere words on which to concentrate his attention, arouse his interest and base his decision.

Those are the three processes of mind of the respective customer must go through, as every salesman knows, before he (the salesman) can get an order. First, get the attention of the customer, then arouse his interest and finally convince him. These are the three principles or elemental steps—the order follows simply—logically.

Now the catalog sometimes does all three of those things. When a catalog is first sent to a customer, if it is to be effective and do its best work, it must get his attention. If it be a work of art it will surely be given more attention than if it were a cheap product poorly printed with poor engravings and nothing out of the ordinary. If it "looks good," no matter whether the article described in it have merit or appeal to the customer, he will turn over its pages and examine it, just the same as a counterfeit hundred dollar bill lying in the street in front of you would attract your attention.

Now the second mental state or condition the catalog should produce is that of interest and this depends on the ability and art of the author, the printer and the engraver. Of course the quality, merit and character of the product described enters here, but not in so far as the catalog itself is concerned. Be the product of the concern good, bad or indifferent, the catalog, if it be well executed, will enhance their value in the mind of the customer, by the power of suggestion alone, and prejudice him in favor of the goods.

In the case of heavy machinery or products, if the catalog has secured attention and interest, it has done its work, although there is no doubt but that it often also brings conviction. However, the latter is usually the work of the salesman, as sales in such lines are usually for such large amounts and involve so much detail as to prices, delivery and particular features, that it is desirable to close the deal through some expert or a member of the firm.

That the catalog is the firm's greatest aid in putting its goods on the market is shown by the fact it can be placed in the hands of thousands of customers, actual and prospective, where it can be referred to at a moment's notice day or night, a salesman "always on the job," never anywhere else and one that never makes mistakes.

So then, the catalog should express the character of the firm behind it. Printed words and pictures speak louder than the voice of the salesman. It goes where the salesman cannot go and when he cannot be there. The catalog can be made to express character, quality and dependability just as much as the product of the concern can. It is only necessary that the same amount of energy, skill and ability be exerted in producing the catalog that is expended in the production of the goods themselves. And why not? But how many of the largest concerns give the same consideration to the work of compiling a catalog that they do to the perfecting of some expensive machine or device? Ordinarily they hire some inexperienced advertising man or promote some clerk in the office to do this work and then wonder why their printed matter does not have the same character, style and business-bringing qualities of some even less successful firm. They may spend five or ten thousand dollars a year for the services of an expert to design their machinery and a thousand a year for the services of a man on whom depends the work of properly bringing before their customers the merits and advantages of this high priced expert's work.

Economical Use of Wood

That general investigations in wood utilization are playing an important part in the government's work in the conservation of forest resources is attested by the report of the secretary of agriculture, which has just been issued. In regard to the work, it says:

"The studies in wood preservation and in the strength

and physical properties of different kinds of wood maintained the position of the forest service as leader toward more economical use of wood material. Special attention was given to working out practicable methods for treating farm timbers in small quantities."

Obituary

The death of Mr. John Wohrle, chief car inspector at Columbus, O., occurred at 6:30 a. m., on December 6, 1908, at his late residence, 267 East Eleventh avenue, Columbus, O., at the age of 62 years and 9 months. Mr. Wohrle was born in Columbus on February 27, 1846, and received his education in the Columbus public schools; his parents, Mathias and Helena Wohrle, were born in Baden, Germany, and Mr. Wohrle was brought up in the German-Lutheran faith.

On February 2, 1865, he enlisted with Company G, 185th Ohio Volunteers, and received honorable discharge from the army September 26, 1865. He was married at Columbus, O., in December, 1870, to Miss Anna Rheinhart, of Columbus; this union was blessed with five children, three of whom with the widow survive; Mr. Edward Wohrle, of New York, Mrs. Seabert and Miss Nettie Wohrle, both of Columbus.

In 1867 Mr. Wohrle began active business in his native city as builder and contractor. He commenced his railroad career in 1870 with the H. V. Ry. in their car department and remained with that road until 1881, when he went to the N. & W. Ry., S. V. Div., at Portsmouth, O. In 1894 he resigned his position with that road and took service with the C. S. & H. Ry. at Columbus in the capacity of general foreman of the car department and retained that position until May 15, 1901, at which time he was elected by the railroad companies at Columbus as chief joint car inspector, which position he held up to the time of his death.

Mr. Wohrle stood very high in the estimation of railroad officers and his death is recognized by them as a distinct loss to the mechanical and car departments of the railroads at Columbus. His sudden death was a shock to his friends as he was apparently in perfect health up to the very hour of his death, his demise being caused by heart failure. His funeral took place on December 9 and was very largely attended, many railroad officials from out of town being present. Interment was at Greenlawn Cemetery, Columbus, O.

Trade Notes

The Russell Car & Snow Plow Company, Ridgway, Pa., recently shipped a size No. 6 pedestal electric snow plow to the Bangor Railway & Electric Company, Bangor, Me.; a size No. 2 double-track plow to the Buffalo, Rochester & Pittsburgh at Rochester, N. Y.; a size No. 6 pedestal electric plow to the Lewiston, Augusta & Waterville Street Railway at Augusta, Me., and a size No. 6 combination car and snow plow with double-track steel noses to the Ottawa Electric Company, Ottawa, Canada.

The Railroad Automatic Track Inspector Company, Tacoma, Wash., has received a conditonal order for one of its automatic track inspectors to be shipped to Richley-Tuddenham & Co., Buenos Ayres, S. A.

The Teredo-Proof Paint Company, New York, has an order from the Charlotte Harbor & Northern for paint to treat 500 piles to be used for a wharf in Florida. The paint is to be applied in four coats, which, it is considered, will be sufficient to protect the timber from teredos. The cost of material and application will be about 10 cents per lineal foot.

The Kerite Insulated Wire & Cable ompany, 30 Church street, New York, has secured the services of Mr. Azel Ames, Jr., signal engineer of the electric zone of the New York Central & Hudson River R. R. Mr. Ames will take charge of the railroad department of the company and will be located at the New York office of the company.

The United States Lock-Nut Company, New York, has been incorporated to manufacture lock-nuts. The incorporators are: Leon S. Brach, Eugene W. Mente, B. H. Stern, all of New York. Capital, $50,000.

The Hess Steel Castings Company, Camden, N. J., has been incorporated, with $750,000 capital, to manufacture iron, steel, coke, copper, etc., and to construct bridges and buildings. The incorporators are: F. R. Hansell, W. F. Eidell and J. A. McPeak.

The Gordon Battery Company, 39 Cortlandt street, New York, has announced that it has been succeeded by the Lutz-Lockwood Manufacturing Company, and that accounts due, communications regarding, or orders for, Gordon primary cells should be addressed to that company.

Edgar M. Cain & Co., Wilmington, Del., patentees of an automatic train stop and whistle signal, have incorporated with the following officers: President, U. G. Glick, Wilmington, Del.; vice-president, H. A. Cain, Philadelphia, Pa.; general manager, E. L. Cain, Wilmington; treasurer, James Scarlett, Philadelphia, and secretary, Edward W. Scarlett, Philadelphia.

A new factory is being constructed in Cambridge by Peter Gray & Son, whose increasing business compels them to take larger quarters than those now occupied in Boston. It will be entirely occupied by them for the manufacture of lanterns and sheet metal work of various kinds.

The Raymond Concrete Pile Company, of New York and Chicago, have been awarded the following contracts: Placing Raymond concrete piles in the foundations of the new post office which is being erected at St. Louis, Mo.; James Knox Taylor, supervising architect, U. S. Treasury Department; Bedford Stone & Construction Company, general contractors. About 55,000 feet of piling will be required in this work. Another contract calls for the placing of Raymond concrete piles in the foundations of a grocery warehouse building for E. D. Depew at Canal and Greenwich streets, New York; Radcliffe & Kelly, architects. The warehouse will be six stories in height, but the foundations are designed to support three additional stories should they be required. On account of the purposes to which the building will be put, the foundations will be called upon to sustain unusually heavy loads.

Mr. Frank C. Osborn, president of the Osborn Engineering Co., Consulting Engineers, Cleveland, Ohio, was recently appointed one of the commissioners of the Cuyahoga County Court House Commission, which has charge of building the new county court house and other county buildings.

The Ritter Folding Door Co., Cincinnati, Ohio, has been awarded the contract for equipping the shops of the Carolina, Clinchfield & Ohio at Erwin, Tenn., with Ritter folding doors, constructed of wood and glass. The contractors for these shops are John P. Pettyjohn & Co., Lynchburg, Va.

BOOK DEPARTMENT (Continued)

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The Heating and Ventilation of Buildings by R. C. Carpenter 4.00
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